

ABSTRACT

An active diffraction grating that has a high degree of freedom in control, small size and high reliability is realized. The active diffraction grating comprises an optical waveguide formed on a two-dimensional plane and electrodes formed on both sides of the optical waveguide, wherein one of the electrodes is formed as plural spot electrodes at a constant spacing in a matrix form on the two-dimensional plane, and with respect to the size of the spot electrodes and the distance between the spot electrodes, the spot electrodes are small and dense enough to function as a line when the spot electrodes are arrayed in a straight line within the diameter of light incident on the optical waveguide, and wherein plural spot electrodes of the spot electrodes arranged in the matrix form are selected and a voltage is applied thereto so as to form at least two parallel lines having a predetermined angle to the traveling direction of the light incident on the optical waveguide, and when the light incident on the two-dimensional plane waveguide is reflected by said at least two parallel lines, the refractive index of the optical waveguide is partly changed so that the wavelength of the light, the angle of the two lines to the incident light and the distance between the lines satisfy a Bragg reflection condition.